ington Territory, on the 23d, to 40° at Olympia, Washington Territory, on the 21st.

Middle Pacific coast region.—From 16° at Cape Mendocino, California, on the 25th, to 33° at Red Bluff, California, on the 30th.

South Pacific coast region.—From 22° at San Diego, California, on the 14th, to 40° at Los Angeles, California, on the 30th.

FROSTS.

During June, 1884, frosts occurred in the various states as follows:

Colorado.—Summit of Pike's Peak, 9th, 14th.

Connecticut.—Winsted, 14th; New Haven, 15th and 16th, in the suburbs; New London, 15th; Hartford, 15th.

Illinois.—Sycamore, 10th, 11th.

Iowa.—Independence, 12th, 13th, 17th, 21st, 22d.

Kansas.—Wyandotte, 10th, 11th.

Maine.—Bangor, 14th, 15th, killing vegetation to a large extent on the first mentioned date; Portland, 14th; Cornish, 2d, 6th, 14th; Gardiner, 1st, 2d, 14th, 15th; Orono, 14th.

Massachusetts.—Boston, 16th; Milton, 1st; Westborough, 2d, 15th; Fall River, 15th; Rowe, 15th.

Michigan.—Traverse City, 10th.

Minnesota.—Chester, 26th.

Nevada.—Carson City, 15th.

New Jersey.—Somerville, 4th, 15th, 16th; Readington, 15th, 16th; Vineland, 16th; Salem City, 1st, 16th, 28th; Caldwell, 15th and 16th, causing some damage to vegetation, and on the 29th, very light.

New York.—North Volney, 14th; Factoryville, 15th; Humphrey, 14th, 15th, 16th.

North Carolina.—New River Inlet: a light frost is reported to have occurred at points twenty-five miles northeast of this station, on the 2d.

Ohio.—Margaretta, 9th, 19th, 21st.

Pennsylvania.—Dyberry, 15th, 16th; Blooming Grove, 15th; Wellsboro, 1st, 16th; Quakertown, 16th; Troy, 14th, 15th; Drifton, 15th; Catawissa, 15th and 16th, very injurious to fruit and vegetables in exposed places.

Rhode Island.—Point Judith, 15th, farmers in the vicinity report that gardens were damaged considerably; Providence, 14th, 15th.

Vermont.—Woodstock, 1st; Strafford, 15th.

Wisconsin.—Neillsville, 10th.

The following notes relating to the damaging frosts of the 15th and 16th have been received:

Boston, Massachusetts, 15th: reports from various parts of New England state that the heavy frost on night of the 14–15th, caused considerable damage to growing crops. The Cape Cod district reports that the prospect for a cranberry crop is entirely ruined. Hundreds of acres were blighted, involving a loss of many thousands of dollars. Potatoes and corn and vines of all kinds were also seriously affected. Much of the corn will have to be replanted, and, owing to the lateness of the season, a short crop will be the result. In Norfolk county, Massachusetts, entire crops of vegetables were destroyed, and farmers who make a specialty of early produce will suffer extensively. In nearly all sections the growth of the crops was retarded.

Port Jefferson, Long Island, 16th: there was a heavy white frost last night on this part of Long Island, destroying potatoes, strawberries, and all vegetables. It is impossible to estimate the amount of damage done.

Philadelphia, Pennsylvania, 16th: advices from southern New Jersey say that the thermometer at sunrise this morning marked 38°. There was considerable frost in meadows and low places. It is feared much damage will be done to watermelons, citrons, and other tender vegetation, which has already suffered much from the recent cold winds.

Providence, Rhode Island: during the night of the 14–15th a damaging frost occurred; a frost at so late a date in this region is of rare occurrence.

PRECIPITATION.

[Expressed in inches and hundredths.]

The distribution of rainfall over the United states and Canada, as determined by the reports from nearly eight hundred stations, is exhibited on chart iii.

The first column of the following table shows the average precipitation for June, 1884, in the several geographical districts; the second column shows the June average for several years, and in the third column is given the excess or deficiency of June, 1884, as compared with the average for several years:

Average precipitation for June, 1884.

Districts.	Average for June. Signal-Service observations.		Comparison of June, 1884, with the average for several years.
	For several years.	For 1884.	
	Inches.	*Inches*	*Inches.*
New England	3.91	3.29	0.62 deficiency.
Middle Atlantic states	3.64	3.42	0.22 deficiency.
South Atlantic states	4.84	6.18	1.34 excess.
Florida peninsula	5.14	6.04	0.90 excess.
Eastern Gulf states	4.44	8.11	3.67 excess.
Western Gulf states	3.81	4.70	0.89 excess.
Rio Grande valley	2.21	1.38	0.83 deficiency.
Tennessee	4.22	7.09	2.87 excess.
Ohio valley	4.62	2.95	1.67 deficiency.
Lower lake region	3.52	2.24	1.28 deficiency.
Upper lake region	4.12	2.31	1.81 deficiency.
Extreme northwest	4.31	2.04	2.27 deficiency.
Upper Mississippi valley	5.82	4.00	1.82 deficiency.
Missouri valley	5.42	3.86	1.56 deficiency.
Northern slope	2.42	2.68	0.26 excess.
Middle slope	2.03	5.33	3.30 excess.
Southern slope	2.49	2.57	0.08 excess.
Southern plateau	0.34	0.61	0.27 excess.
Northern plateau	0.79	3.42	2.63 excess.
North Pacific coast region	1.14	2.17	1.03 excess.
Middle Pacific coast region	0.15	1.66	1.51 excess.
South Pacific coast region	0.03	0.57	0.54 excess.
Mount Washington, N. H.	9.60	8.08	1.52 deficiency.
Pike's Peak, Colo.	1.92	0.94	0.98 deficiency.
Salt Lake City, Utah	0.71	0.33	0.38 deficiency.

The reports from the various stations show that the precipitation for June, 1884, exceeded the average at all stations on the Pacific coast, in the northern and southern plateau districts, in the western portions of Kansas and Texas, along the immediate western Gulf coast, in Tennessee and in the states bordering on the Atlantic and Gulf coasts from Maryland to Louisiana. Chart iii. shows the area of greatest precipitation to occupy the eastern Gulf states, where the average (see table) as determined by the reports from seven Signal Service stations, is slightly over eight inches, or nearly double the June average for a series of years, while several of the cotton region stations in Georgia and South Carolina report monthly precipitations of from ten to twelve inches. On the Pacific coast the June precipitation has been phenomenal; in Oregon and Washington Territory about double the average amount of rain fell, and in California, where the June average is about one-tenth inch, the amount for June, 1884, was more than ten times as great. In ten of the thirteen years record (from 1871 to 1883 inclusive) at San Francisco, the June precipitation has not exceeded five-hundredths inch, while in the present year the amount was 2.57, or about half inch more than the total amount for the entire period. The Signal Service observer at Sacramento, reports the following: "The rainfall for June, 1884, has never been equaled in the same month since the settlement of this part of the country in 1849, and in only one instance during that period has the June precipitation approached the unprecedented amount for June of the present year, viz: 1.10 in 1875. Reports from all parts of the state show that hay and small fruits were badly damaged, but the benefits derived by grain, hops and the later fruits more than compensate for the the losses sustained by the other crops." Although the table of average precipitation shows a deficiency of more than one-half inch for the district of New England, the monthly rainfall was excessive in eastern Massachusetts, Rhode Island (except at Block Island), Connecticut, and in the vicinity of New York City, being due to the heavy rains which fell on the 25th

and 26th, in connection with the passage of low area vi. With the exception of the districts named above the precipitation for June has been below the average, the deficiencies being most marked in the extreme northwest, upper lake region, upper Mississippi and Missouri valleys, and in northern New England, where they averaged from one and three-fourths to two and one-fourth inches; in the Ohio valley and lower lake region, the deficiencies averaged about one and one-half inches; in central Texas, western Colorado, and in Utah, the deficiencies were generally less than one inch.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The departures exhibited by the reports from the regular Signal Service stations are shown in the table of average precipitation. Voluntary observers report the following notes in connection with this subject.

Arkansas.—Lead Hill, Boone county: monthly precipitation, 3.57 is 3.12 below the June average of the two preceding years.

Georgia.—Milledgeville, Baldwin county: monthly precipitation, 7.64, is the heaviest June rainfall for many years.

Mr. Thomas Scott of Forsyth, Monroe county, reports the monthly precipitation, 6.73, to be the heaviest that has occurred in June during the last forty-one years.

Illinois.—Swanwick, Perry county: monthly precipitation, 5.66 is 0.96 above the June average of the last three years.

Anna, Union county: monthly precipitation, 7.44, is 1.40 above the June average of the last nine years.

Riley, McHenry county: monthly precipitation, 4.22, is 0.12 above the June average of the last twenty-three years. The largest June precipitation of that period, 9.17, occurred in 1868; the smallest, 0.64, occurred in 1863.

Mattoon, Coles county: monthly precipitation, 6.87, is 2.27 above the June average of the four preceding years.

Collinsville, Madison county: monthly precipitation, 3.73, is 1.75 below the June average.

Morrison, Whiteside county: monthly precipitation, 4.83, is 1.13 below June average of the last nine years.

Indiana.—Wabash, Wabash county: monthly precipitation, 2.23, is 2.33 below the June average of the last eight years.

Logansport, Cass county: monthly precipitation, 4.25, is 0.49 above the June average of the last twenty-five years.

Kansas.—Independence, Montgomery county: monthly precipitation, 2.52, is 3.30 below the June average of the last twelve years.

Lawrence, Douglas county: monthly precipitation, 3.81, is 1.30 below the June average of the last sixteen years.

Wellington, Sumner county: monthly precipitation, 4.21, is 0.18 below the average of the last six years.

Maine.—Gardiner, Kennebec county: monthly precipitation, 1.22, is 2.00 below the June average of the last forty-eight years, and is, with the exception of 1.16 for June, 1877, the smallest for that period.

Maryland.—Fallston, Harford county: monthly precipitation, 5.00, is 0.86 above the June average of the last thirteen years.

New Hampshire.—Antrim, Hillsborough county: monthly precipitation, 1.30, is 2.79 below the June average of the last ten years.

New Jersey.—South Orange, Essex county: monthly precipitation, 6.02, is 2.65 above the June average of the last fourteen years.

New York.—Palermo, Oswego county: monthly precipitation, 1.27, is 1.40 below the June average of the last thirty-one years.

North Volney, Oswego county: monthly precipitation, 1.15, is 1.97 below the June average of the last twelve years, and is the smallest June precipitation for that period.

Dannemora, Clinton county: monthly rainfall, 2.23, is the smallest June precipitation of the last five years.

Ohio.—Wauseon, Fulton county: monthly precipitation, 2.79, is 1.85 below the June average of the last twelve years.

Table of excessive and greatest monthly precipitation.—June, 1884.

Station.	Specially heavy.		Largest monthly.	Station.	Specially heavy.		Largest monthly.
	Date.	Amt.	Amount.		Date.	Amt.	Amount.
Alabama.				*Indiana*—Cont'd.			
Clintonville	7 to 10	4.21	15.65	Indianapolis	8, 9	3.77	
Do	14, 15, 16	10.14		Vevay	13	2.15	
Clanton	4, 5	2.50	12.94	*Iowa.*			
Do	14, 15	3.50		Independence	23, 24	2.85	
Do	29, 30	3.00		*Kansas.*			
Auburn	28	4.00	11.52	Dodge City	17	2.04	7.64
Montgomery	29, 30	3.97	10.26	Wellington	22, 23	2.45	
Opelika	13, 14	3.49	9.97	Manhattan	21, 22	2.30	
Do	28	2.38		Westmoreland	21, 22	2.25	
Greenville	29, 30	2.01	9.72	Atchison	7, 8	2.05	
Eufaula	7	2.38	8.00	Fort Scott	17	2.00	
Jacksonville	11, 12	1.82	8.56	*Louisiana.*			
Mount Vernon Barracks	26, 27, 28	2.86	7.75	Alexandria	3, 4	2.62	9.26
Green Springs	30	2.60	7.57	Do	25	2.08	
Calera	29, 30	1.80	7.55	Do	28	2.75	
Greensborough	28, 29	2.88	7.39	New Orleans	30	1.75	8.60
Gadsden	29, 30	2.15	7.20	Baton Rouge			6.20
Mobile	5, 6	1.67	7.01	*Maryland.*			
Marion	29, 30	1.66	6.55	Great Falls	14, 15	2.47	
Prattville	14, 15	3.50	6.56	*Massachusetts.*			
Do	29, 30	2.50		Taunton	25, 26	3.50	
Edwardsville	23	2.00	6.38	Fall River	25, 26	2.95	
Trinity			6.03	Milton	25	2.90	
Tuscaloosa			6.02	Boston	25, 26	2.73	
Dadeville			6.00	Westborough	25, 26	2.27	
Fayette	22	3.00		Somerset	25, 26	2.71	
Selma	29, 30	2.39		Princeton	25, 26	2.52	
Arizona.				Worcester	25	2.17	
Fort Apache	14	1.60		Thatcher's Island	26, 20	1.94	
Arkansas.				*Michigan.*			
Madison			6.67	Mottville	2	2.75	
Fayetteville	18	2.00		Northport	21	2.50	
Arkansas City	16, 17	2.20		Marshall Mills	18	2.30	
Connecticut.				Grand Rapids	25, 26	2.18	
New London	25, 26	5.97	6.29	*Minnesota.*			
New Haven	25, 26	4.85		Fort Snelling	7	2.54	
Voluntown	26	4.50		*Mississippi.*			
Bethel	26	3.50		Macon	15, 16	2.48	7.76
Dakota.				Holly Springs	29, 30	2.17	7.62
Webster	6, 7	2.53	8.01	Columbus	3, 4	2.62	7.01
Do	24, 25	3.07		Brookhaven	25, 26	1.97	6.90
Richardton			6.00	Aberdeen	16	2.68	6.74
Morriston	7, 8	2.03		Oxford	3	2.50	6.21
District of Columbia				Corinth	4, 5, 6	5.36	
Receiving Reservoir	11, 12	3.19	8.12	Hernando	3, 4, 5	3.59	
	14, 15	3.25		Edwards	3, 4	2.33	
Washington City	10, 11	2.41	6.95	Jackson	3	2.02	
Do	13, 14	3.46		*Missouri.*			
Distributing Reservoir	14, 15	2.79	6.20	Saint Charles			6.55
West Washington	12, 13	3.03	6.17	*Montana.*			
Florida.				Fort Custer	11, 12	2.06	
Fort Barrancas	24, 25	2.34	11.99	*Nebraska.*			
Do	28, 29	2.36		Omaha	21, 22	1.80	6.11
Archer	10, 11	3.93	11.66	*New Hampshire.*			
Do	22	2.10		Mt. Washington	9, 10	3.10	8.08
Sanford	11	2.04	9.57	*New Jersey.*			
Limona	11	4.75	9.45	Readington	25, 26	8.10	8.80
Live Oak	24	2.19	9.32	Somerville	25, 26	5.60	6.20
Pensacola	14, 15	1.96	7.84	South Orange	25, 26	5.42	6.02
Saint Augustine	22	4.20	7.43	Caldwell	25, 26	5.40	5.66
Mayport	16	2.63	7.23	Lambertville	25	4.39	
Jacksonville	22	1.48	6.89	Sandy Hook	25, 26	3.62	
Cedar Keys	22, 23	2.96	6.68	Phillipsburg	25, 26	3.33	
Key West	21, 22	2.10		Barnegat City	26	2.03	
Georgia.				*New York.*			
Griffin	12	2.48	12.22	Humphrey	23	3.38	7.02
Do	15	2.00		White Plains	25, 26	6.20	6.40
Gainesville	24, 25	2.88	12.10	Fort Columbus	26	4.87	5.45
Fort Gaines	10	2.05	11.40	Fort Hamilton	26	3.75	
Do	28, 29	4.67		New York City	25, 26	3.03	
Atlanta	30	1.42	10.73	David's Island	26	3.00	
Newnan			10.55	West Point	26	2.50	
Athens	21	2.44	10.46	*North Carolina.*			
Do	24, 25	3.74		Brevard	23, 24, 25	4.10	12.94
Do	12 to 15	4.20		Lenoir	24 to 27	4.00	10.30
Thomasville			10.45	Charlotte	11	2.84	9.47
West Point	14, 15	3.21	9.94	Highlands	23, 24	3.00	8.35
Do	30	2.00		Statesville			7.99
Toccoa	24, 25	3.94	9.78	Wilmington	11	1.83	7.94
Jesup	15, 16	2.95	9.45	Goldsborough			6.21
Savannah	23, 24	4.37	9.37	Raleigh	26	2.36	
Quitman	23, 24	2.01	9.13	Kitty Hawk	13, 14	3.16	
Macon	24, 25	2.24	8.56	Scott's Hill	14, 15	1.91	
Dalton	7	1.72	8.51	*Ohio.*			
Way Cross	24	2.30	7.97	Logan			6.61
Milledgeville			7.64	Cleveland	9, 10	3.00	
Cartersville			7.34	Toledo	9, 10	2.39	
Washington			6.74	*Oregon.*			
Forsyth			6.73	Lakeview	10	3.15	6.53
Illinois.				*Pennsylvania.*			
Petersburg	9, 10	1.95	9.35	Grampian Hills	10	8.00	9.85
Do	19, 20	2.10		West Chester	25, 26	6.08	7.52
Greenville	9, 10	2.05	8.15	Quakertown	25, 26	5.20	6.54
Golconda	6	3.24	7.52	Hulmeville	25, 26	4.76	
Anna	4	2.15	7.44	Wellsborough	24, 25	3.00	
Mattoon			6.87	Tamaqua	25, 26	2.40	
Springfield	8, 9	2.49	6.20	Haverford College Observatory	25, 26	4.83	
Rockford			6.16	Fallsington	25, 26	4.51	
Morrison	2	2.55		Chambersburg	25, 26	3.30	
Indiana.				Philadelphia	26	2.48	
Clinton	7	2.29	10.64	Germantown	25, 26	3.27	
Do	24	2.97		Blooming Grove	26	2.20	

Table of excessive and greatest monthly precipitation.—Cont'd—*June*, 1884.

Station.	Specially heavy.		Largest monthly.
	Date.	Amt.	Amount.
Penn'a.—Cont'd.			
Catawissa	24, 25, 26	2.65	
Franklin	30	2.27	
Rhode Island.			
Point Judith	26	4.96	5.82
Narragansett Pier	26, 27	3.78	
Providence	25, 26	3.20	
South Carolina.			
Hardeeville	13	3.25	12.59
Do	23, 24, 25	3.54	
Greenwood			10.51
Greenville	24, 25	4.37	9.09
Chester	21, 22	3.00	8.99
Charleston	13, 14	2.50	8.25
Florence	27	2.90	7.39
Anderson	24	2.03	7.22
Spartanburg	25	2.85	6.90
Branchville	15	2.05	6.55
Columbia	15	2.59	
Yemassee	15	3.00	
Blackville	23, 24	2.06	
Cheraw	26, 27	2.73	
Tennessee.			
Grief	6, 7	3.04	10.57
Marysville	13	2.19	9.60
Parksville	6, 7	2.75	9.46
Riddleton	25	2.39	9.21
Chattanooga	6, 7	3.16	9.20
Savannah	5, 6, 7	2.47	8.82
Henderson	5	2.76	8.16
Lafayette	10	2.00	7.65
Fostoria	5, 6, 7	2.60	7.04
Memphis			7.30
Tenn.—Cont'd.			
Cookville			6.60
Grand Junction	5	2.03	6.56
Nashville	5, 6	1.91	6.53
Decatur			6.20
Florence			6.17
Murfreesborough			6.08
Milan	3 to 6	2.84	
Bolivar	5	2.11	
Texas.			
Cleburne	2, 3	9.10	10.09
Indianola	21, 22	4.20	7.56
Sour Lake	3	5.07	6.95
Fort Elliott			6.86
Galveston	3, 4	2.50	6.84
Do	19, 20	3.13	
Paris			6.01
Tyler	3	3.00	
Clarkesville	19	3.21	
Brownsville	23, 24	1.75	
Vermont.			
Newport	24, 25	2.05	
Virginia			
Snowville	8	2.30	7.80
Norfolk	30	1.92	6.45
Fort Myer	13, 14	3.22	
Fort Monroe	30	2.45	
Wytheville	25, 26, 27	2.31	
West Virginia.			
Helvetia	23, 24, 25	2.74	
Wisconsin.			
Embarras	7, 8	3.10	8.35
Do	22, 23	2.90	

Table of smallest monthly precipitation, June, 1884.

Station.	Amt.
Arizona.	
Texas Hill	0.00
Willcox	0.04
Wickenburg	0.06
San Simon	0.08
Fort McDowell	0.09
Tucson	0.10
Fort Bowie	0.12
Phœnix	0.15
Fort Verde	0.23
Maricopa	0.32
Prescott	0.32
San Carlos	0.49
Fort Thomas	0.52
California.	
Redding	0.00
Bishop Creek	0.00
Daggett	0.00
Deming	0.00
Indio	0.00
Mammoth Tank	0.00
Mojave	0.00
Needles	0.00
Fenner	0.05
Delano	0.22
San Diego	0.31
Colton	0.32
Poway	0.44
Hydesville	0.63
Keeler	0.80
Hawthorne	0.89
Sumner	0.90
Willows	0.90
Cape Mendocino	0.92
Kingsburg	0.92
Red Bluff	0.97
Colorado.	
Pike's Peak	0.94
Dakota.	
Fort Meade	0.48
Fort Buford	0.99
Michigan.	
Manistique	0.97
Montana.	
Fort Shaw	0.97
Nevada.	
Brown's	0.49
Tecoma	0.50
Toano	0.55
Halleck	0.56
Reno	0.80
New Hampshire.	
Weir's Bridge	0.80
New Mexico.	
Lordsburg	0.00
Fort Craig	0.37
New York.	
Madison Barracks	0.99
Oregon.	
East Portland	0.12?
Ashland	0.24
Texas.	
Rio Grande City	0.02
El Paso	0.11
Utah.	
Salt Lake City	0.33
Kelton	0.35
Terrace	0.46
Nephi	0.50
Blue Creek	0.52
Ogden	0.61
Corinne	0.70
Modesto	0.99
Washington Territory.	
Pleasant Grove	0.47
Ainsworth	0.90
Wyoming.	
Fort Bridger	0.10
Fort Fred Steele	0.30

Pennsylvania.—Dyberry, Wayne county: monthly precipitation, 1.27, is 2.00 below the June average of the last twelve years.

Texas.—New Ulm, Austin county: monthly precipitation, 2.82, is 1.25 below the June average of the last twelve years.

Vermont.—Woodstock, Windsor county: monthly precipitation, 1.88, is 1.58 below the June average of the last sixteen years.

Virginia.—Wytheville, Wythe county: monthly precipitation, 5.92, is 1.85 in excess of the June average for a period of twenty-one years, and has been exceeded but once in that time, viz: in 1875.

Variety Mills, Nelson county: monthly precipitation, 5.33, is 2.47 above the June average of the last six years.

West Virginia.—Helvetia, Randolph county: monthly precipitation, 5.69, is 0.23 below the June average of the last eight years.

SNOW.

The observer at Red Bluff, California, states that reports from the lumber mills, thirty miles east of that place, on the 13th, announced that on that date snow fell to a depth of one foot.

MONTHLY SNOW-FALLS.

The following monthly snow-falls have been reported:

Summit, California, six inches; Cisco, California, three inches.

On the summit of Pike's Peak, Colorado, there remained on the ground at the close of the month twenty-four inches of unmelted snow.

SLEET.

Sleet was reported on the summit of Pike's Peak, Colorado, from the 1st to 4th, 6th, 7th, 10th, 16th, 18th, 21st, 22d, 26th.

HAIL.

Shelbyville, Shelby county, Illinois: a severe hail and rain storm passed over this place on the evening of the 3d.

Tipton, Moniteau county, Missouri: a very severe hail storm passed over this place on the afternoon of the 4th; it began at 1.20 p. m. and lasted twenty minutes; great damage was done to the growing corn.

Fort Totten, Dakota: a hail storm, lasting twenty minutes, occurred two miles east of the station between 3.40 and 5 p. m. of the 6th; the width of the storm's track was about two miles; no serious damage resulted.

Fall River, Bristol county, Massachusetts: the hail storm of the 7th, though of short duration, caused a great deal of damage; the early crops were destroyed and young poultry killed by the hailstones.

Emmettsburg, Palo Alto county, Iowa: a violent hail storm occurred on the afternoon of the 7th; much damage was done to buildings and growing crops.

Los Angeles, California: considerable damage was done at points twelve miles northeast of this station by a hail storm on the 13th.

Richardton, Stark county, Dakota: at 3 p. m. of the 18th, a very severe thunder storm, accompanied by very large hail occurred; during the storm the velocity of the wind was very high, causing the hail-stones to break all window glass of southern exposure.

Vandalia, Fayette county, Illinois: an unusually heavy rain storm, accompanied by large hail-stones, occurred in the southeastern part of this county on the 21st; great damage was done to the growing crops, and numerous bridges were washed away.

Charlotte, North Carolina: at about 3. p. m., of the 22d, a very destructive hail-storm visited Mecklenburg county; on several farms the crops of cotton, corn, and oats were entirely destroyed.

Denver, Colorado: a severe hail storm occurred at Central City, Gilpin county, on the afternoon of the 22d.

Blacksburg, Montgomery county, Virginia: during the evening of the 22d, hail stones about the size of partridge eggs fell, resulting in no serious damage.

Fort Maginnis, Montana: on the 23d, a severe hail-storm from the southeast began at 1.50 p. m., and continued for fifteen minutes. The hail stones were one inch in diameter and caused serious injury to the post garden; windows were also broken.

Independence, Montgomery county, Kansas: during the thunder-storm of the 24th, hail as large as quail eggs fell in places along the track of the storm; some damage was done to corn, fruit, and other crops.

Fort Buford, Dakota: the thunder-storm of the 26th, was accompanied by hail measuring three-fourths of an inch in diameter; no damage resulted.

Hail storms of less violence occurred in the various states and territories as follows:

Alabama.—Green Springs, 9th.

Arizona.—Fort Grant, 28th.

California.—Princeton, 4th; Los Angeles, 13th; Fort Bidwell, 23d.

Colorado.—West Las Animas, 5th, 6th, 9th, 16th; Pueblo, 9th, 16th, 20th; Denver, 14th; Pike's Peak, 27th, 28th, 30th.

Dakota.—Deadwood, 3d, 27th; Fort Bennett, 5th, 15th, 21st, 25th; Richardton, 6th, 14th; Fort Sully, 11th, 14th; Fort Yates, 17th; Fort Buford, 26th, 27th, 28th; Fort Lincoln, 28th; Bismarck, 28th.

Georgia.—Atlanta, 20th.

Illinois.—Polo, 1st, 18th; Chicago, 2d.

Indiana.—Spiceland, 1st; Indianapolis, 9th; Clinton, 24th.

Iowa.—Indianola, 13th.

Kansas.—Dodge City, 6th; Wyandotte, 7th, 8th, 13th; Sherlock, 11th; Salina, 25th.

Maine.—Portland, 6th.

Massachusetts.—Taunton, 7th.

Michigan.—Marshall, 24th.

Missouri.—Saint Louis, 3d, 8th.

Montana.—Fort Custer, 5th, 10th; Fort Assinaboine, 13th, 28th; Fort Ellis, 27th.

Nebraska.—Red Willow, 11th, 25th; Yutan, De Soto, and Marquette, 25th; North Platte, 30th.

New Hampshire.—Mount Washington, 3d, 6th, 7th.

New Mexico.—Fort Union, 30th.

New York.—Humphrey, 9th.

North Carolina.—Statesville, 11th; Brevard, 21st.

Ohio.—Westerville, 2d.

Pennsylvania.—Wellsborough 24th.

Tennessee.—Ashwood, 7th.

Texas.—Fort Concho, 2d; Cleburne, 2d, 3d; Clarksville, 8th; Fort Stockton, 12th.

Vermont.—Charlotte and Lunenburg, 6th.

Virginia.—Norfolk, 8th; Wytheville, 10th.

Washington Territory.—Bainbridge Island, 3d.

Wisconsin.—Embarras, 8th.

RAIN FROM A CLOUDLESS SKY.

Mr. A. C. Willsams, of Elk Falls, Elk County, Kansas, reports that rain fell from a cloudless sky at that place on the 16th.

Table of rainy and cloudy days, relative humidity, and dew-point for June, 1884.

Districts.	Rainy days.	Cloudy days.	Rel. humidity.*	Dew-point.
			Percentages.	°
New England	From 5 to 7	From 2 to 7	From 66.0 to 83.8	From 48.0 to 57.1
Middle Atlantic states	" 4 " 14	" 3 " 12	" 58.6 " 85.4	" 55.9 " 64.2
South Atlantic states	" 9 " 21	" 6 " 16	" 74.7 " 84.9	" 61.5 " 69.3
Florida peninsula	" 10 " 21	" 3 " 5	" 74.2 " 78.6	" 69.0 " 72.5
East Gulf states	" 13 " 19	" 4 " 11	" 72.4 " 79.1	" 66.6 " 69.2
West Gulf states	" 6 " 12	" 0 " 4	" 73.7 " 80.7	" 65.8 " 72.8
Rio Grande valley	" 1 " 11	" 1 " 2	" 62.9 " 80.2	" 69.9 " 72.3
Ohio valley	" 9 " 12	" 6 " 12	" 64.6 " 76.6	" 59.7 " 65.8
Tennessee	" 17 " 19	" 10 " 13	" 75.7 " 80.7	" 62.4 " 65.2
Lower lake region	" 4 " 13	" 1 " 7	" 67.4 " 73.7	" 55.2 " 60.3
Upper lake region	" 6 " 15	" 2 " 8	" 66.9 " 78.4	" 47.5 " 56.8
Extreme northwest	" 7 " 10	" 2 " 8	" 60.0 " 78.8	" 52.8 " 60.7
Upper Mississippi valley	" 11 " 18	" 4 " 12	" 68.7 " 82.9	" 58.6 " 67.7
Missouri valley	" 7 " 10	" 1 " 4	" 67.4 " 75.4	" 59.3 " 63.3
Northern slope	" 7 " 16	" 1 " 9	" 51.5 " 70.4	" 40.7 " 59.6
Middle slope	" 9 " 13	" 0 " 4	" 53.4 " 74.2	" 47.2 " 62.3
Southern slope	" 6 " 14	" 1 " 3	" 57.6 " 67.9	" 53.6 " 64.3
Southern plateau	" 2 " 8	" 1 " 3	" 24.9 " 50.7	" 33.0 " 43.4
Northern plateau	" 7 " 18	" 7 " 8	" 60.7 " 67.4	" 49.2 " 55.6
North Pacific coast region	" 14 " 16	" 11 " 18	" 67.3 " 86.9	" 50.0 " 51.2
Middle Pacific coast region	" 7 " 10	" 6 " 14	" 59.4 " 85.5	" 50.2 " 55.1
South Pacific coast region	" 0 " 6	" 1 " 13	" 41.9 " 78.4	" 52.6 " 57.1
Mt. Washington, N. H.	Thirteen	Two	78.2	41.7
Pike's Peak, Colo.	Ten	Three	79.7	25.0
Salt Lake City, Utah	Four	Two	39.4	41.0

* Relative humidity corrected for altitude.

COTTON REGION REPORTS.

From the following table it will be seen that the precipitation for June, 1884, in the cotton regions exceeded the average for the same month in the two preceding years, in all of the districts, except that of New Orleans, where a deficiency of 1.35 is shown. For the district of Atlanta the excess is nearly six inches, and it exceeds two inches in the districts of Savannah, Montgomery, and Mobile; in the remaining districts the excesses varied from about normal for Vicksburg to 1.68 inches for Augusta. The means of the maximum and minimum temperatures were generally lower by from 1° to 6° in all districts.

Temperature and rainfall data for the cotton districts, June.

Districts.	Rainfall.			Temperature.						Extremes for June, 1884.	
				Maximum.			Minimum.				
	Average for June of two preceding years.	Average for June, 1884.	Departures.	Mean for June of two preceding years.	Mean for June, 1884.	Departures.	Mean for June of two preceding years.	Mean for June, 1884.	Departures.	Max.	Min.
				°	°		°	°		°	°
New Orleans	5.54	4.19	— 1.35	90.4	89.4	— 1.0	72.1	68.1	— 4.0	102	53
Savannah	5.45	8.05	+ 2.60	90.5	85.7	— 4.8	70.8	65.1	— 5.7	106	41
Charleston	4.88	6.28	+ 1.40	90.2	84.9	— 5.3	68.2	64.8	— 3.4	98	48
Atlanta	3.36	9.13	+ 5.77	88.7	82.5	— 6.2	66.8	62.6	— 4.2	98	48
Wilmington	4.04	6.01	+ 1.37	89.4	84.4	— 5.0	66.4	62.5	— 3.9	100	44
Memphis	3.71	5.29	+ 1.58	89.8	83.3	— 6.5	67.1	65.4	— 1.7	100	50
Galveston	2.19	3.66	+ 1.47	92.9	90.8	— 2.1	71.3	67.9	— 3.4	100	50
Vicksburg	3.44	3.54	+ 0.10	91.0	87.7	— 3.3	69.4	67.5	— 1.9	98	57
Montgomery	4.26	7.15	+ 2.89	90.4	85.2	— 5.2	69.4	64.0	— 5.4	101	45
Augusta	4.66	6.34	+ 1.68	90.4	85.2	— 5.2	68.3	63.6	— 4.7	103	43
Little Rock	2.55	3.25	+ 0.70	90.6	87.7	— 2.9	65.7	65.8	+ 0.1	103	46
Mobile	3.57	6.30	+ 2.73	93.6	87.9	— 5.7	69.2	66.5	— 2.7	100	46

WINDS.

The most frequent directions of the wind for the month of June, 1884, are shown on chart ii. by arrows flying with the wind. In western New York, New England, and on the middle Atlantic coast the most frequent directions were from south to west; in the southern slope, along the immediate Gulf coast, in the Missouri valley and extreme northwest, they were generally from the south; in the lake region, upper Mississippi and Ohio valleys, and Tennessee, they were from northeast to southeast; on the Pacific coast, from north to west.

TOTAL MOVEMENTS OF THE AIR.

[*In miles.*]

In the following table are given the stations reporting the largest and smallest total movements of the air in each of the various districts:

Districts.	Stations reporting largest.	Miles.	Stations reporting smallest.	Miles.
New England	Block Island, R. I.	8,816	Eastport, Maine	3,341
Middle Atlantic states	Del. Breakwater, Del.	11,441	Lynchburg, Va.	2,053
South Atlantic states	Kitty Hawk, N. C.	10,208	Augusta, Ga.	2,929
Florida peninsula	Cedar Keys	6,885	Sanford	4,627
Eastern Gulf states	Pensacola, Fla	5,401	Vicksburg, Miss.	3,675
Western Gulf states	Indianola, Tex.	6,217	Fort Smith, Ark	2,466
Rio Grande valley	Rio Grande City, Tex.	5,294	Brownsville, Tex.	4,459
Tennessee	Nashville	3,524	Chattanooga	3,034
Ohio valley	Louisville, Ky.	3,995	Cincinnati, Ohio	3,078
Lower lake region	Sandusky, Ohio	8,159	Toledo, Ohio	3,484
Upper lake region	Escanaba, Mich.	5,776	Marquette, Mich.	3,974
Extreme northwest	Moorhead, Minn	8,632	Bismarck, Dak.	5,804
Upper Mississippi valley	Saint Louis, Mo.	6,581	Keokuk, Iowa	2,077
Missouri valley	Huron, Dak.	6,728	Leavenworth, Kans.	2,389
Northern slope	Fort Assinaboine, Mont	7,250	Deadwood, Dak.	4,124
Middle slope	Dodge City, Kan	7,556	West Las Animas	5,174
Southern slope	Fort Stockton, Tex.	6,661	Fort Davis, Tex.	4,358
Southern plateau	Fts. Grant & Verde, Ariz	5,028	El Paso, Tex	3,116
Middle Plateau	Salt Lake City, Utah	4,875		
Northern plateau	Dayton, Wash. T.	3,777	Lewiston, Idaho	1,010
North Pacific coast region	Fort Canby, Wash. T.	6,574	Olympia, Wash. T.	1,300
Middle Pacific coast region	Cape Mendocino, Cal.	12,665	Red Bluff, Cal.	4,733
South Pacific coast region	San Diego, Cal	4,478	Yuma, Ariz.	3,553

On the summits of Mount Washington, New Hampshire, and Pike's Peak, Colorado, the total movements of the air were 19,090 and 13,244 miles, respectively.

HIGH WINDS.

On the summit of Mount Washington, New Hampshire, maximum velocities of fifty miles or more per hour occurred as follows: 60, nw., 4th; 50, nw., 5th; 64, nw., 7th; 56, nw., 8th; 64, w., 9th; 69, nw., 13th; 72, nw., 16th; 74, nw., 21st; 68, sw., 24th; 68, sw., 25th.

The following high velocities were reported from Pike's Peak, Colorado: 64, sw., 10th; 78, sw., 11th; 92, sw., 12th; 60, sw., 13th; 60, s., 14th; 70, w., 16th; 66, w., 24th; 52, w., 26th.